



30-015-40092

COG Operating, LLC

EDDY COUNTY, NEW MEXICO

SKELLY UNIT

SKELLY UNIT # 661

ORIGINAL HOLE

Plan: PLAN1REV1

SHL = 923' FSL & 709' FWL

BHL = 980' FSL & 980' FWL

Top of Paddock = 980' FSL & 980' FWL @ 5100' TVD

Final Survey Report

08 May, 2012



Childress Directional Drilling Survey Report

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well SKELLY UNIT # 661
Project:	EDDY COUNTY, NEW MEXICO	TVD Reference:	RKB @ 3903 00usft (Original Well:Elev)
Site:	SKELLY UNIT	MD Reference:	RKB @ 3903 00usft (Original Well:Elev)
Well:	SKELLY UNIT # 661	North Reference:	Gnd
Wellbore:	ORIGINAL HOLE	Survey Calculation Method:	Minimum Curvature
Design:	ORIGINAL HOLE	Database:	EDM,5000 1 Single User Db

Project	EDDY COUNTY, NEW MEXICO		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	SKELLY UNIT		
Site Position:	Northings:	661,159 10 usft	Latitude: 32° 48' 59 805 N
From: Map	Easting:	653,854.60 usft	Longitude: 103° 49' 57 119 W
Position Uncertainty:	0 00 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0 27 °

Well	SKELLY UNIT # 661		
Well Position	+N-S	0 00 usft	Northings: 665,934 10 usf
	+E-W	0 00 usft	Easting: 649,675 70 usf
Position Uncertainty	0 00 usft	Wellhead Elevation:	usf
			Ground Level: 3,891.00 usf

Wellbore	ORIGINAL HOLE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/25/2012	7.65	60.68	48,861

Design	ORIGINAL HOLE			
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth: 0 00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.00	0 00	0 00	43.97

Survey Program	Date 5/8/2012			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 00	1,890.00	GYROS (ORIGINAL HOLE)		
2,013 00	5,716 00	MWD SURVEYS (ORIGINAL HOLE)	MWD	MWD - Standard

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,890 00	1.37	43.48	1,889.93	6 04	6 28	8 71	0 00	0 00	0 00
2,013 00	0 60	38 70	2,012.91	7 61	7.69	10 82	0 63	-0 63	-3 89
2,106.00	1 10	83 90	2,105.90	8.08	8 89	11 99	0 86	0 54	48 60
2,201 00	1 60	84.40	2,200 88	8.31	11 11	13.70	0 53	0 53	0 53
2,295 00	2 60	95.30	2,294.81	8 24	14 54	16.03	1 14	1 06	11 60
2,389 00	2 90	83.90	2,388.70	8 29	19.03	19.18	0 66	0 32	-12.13
2,484 00	3 30	73 30	2,483.57	9 34	24.04	23 41	0.73	0 42	-11 16
2,577 00	3.80	74 40	2,576 39	10 93	29 57	28.40	0.54	0 54	1 18
2,671 00	4 30	80 50	2,670.15	12 35	36 05	33.92	0 70	0 53	6 49
2,765 00	5.10	78.60	2,763 84	13.76	43.62	40.19	0 87	0 85	-2.02



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Site:	SKELLY UNIT	MD Reference:	RKB @ 3903.00usft (Original Well Elev)
Well:	SKELLY UNIT # 661	North Reference:	Grd
Wellbore:	ORIGINAL HOLE	Survey Calculation Method:	Minimum Curvature
Design:	ORIGINAL HOLE	Database:	EDM 5000 1 Single User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,859.00	6.20	76.80	2,857.38	15.75	52.66	47.89	1.19	1.17	-1.91
2,953.00	5.40	76.30	2,950.90	17.95	61.90	55.89	0.85	-0.85	-0.53
3,047.00	5.50	77.00	3,044.47	20.01	70.58	63.41	0.13	0.11	0.74
3,141.00	4.90	76.50	3,138.08	21.96	78.87	70.57	0.64	-0.64	-0.53
3,235.00	5.60	78.60	3,231.69	23.81	87.27	77.73	0.77	0.74	2.23
3,329.00	6.20	81.60	3,325.19	25.46	96.79	85.52	0.72	0.64	3.19
3,423.00	6.90	80.30	3,418.58	27.15	107.38	94.09	0.76	0.74	-1.38
3,524.00	7.40	80.20	3,518.79	29.28	119.77	104.22	0.50	0.50	-0.10
3,618.00	7.20	78.20	3,612.03	31.51	131.50	113.98	0.34	-0.21	-2.13
3,712.00	6.80	78.10	3,705.33	33.86	142.71	123.45	0.43	-0.43	-0.11
3,806.00	7.00	79.10	3,798.65	36.10	153.78	132.74	0.25	0.21	1.06
3,900.00	7.00	78.80	3,891.95	38.29	165.03	142.13	0.04	0.00	-0.32
3,993.00	7.00	78.10	3,984.25	40.56	176.13	151.47	0.09	0.00	-0.75
4,088.00	6.90	75.90	4,078.56	43.14	187.33	161.11	0.30	-0.11	-2.32
4,181.00	7.00	74.40	4,170.87	46.03	198.20	170.73	0.22	0.11	-1.61
4,275.00	6.90	74.20	4,264.18	49.11	209.15	180.55	0.11	-0.11	-0.21
4,369.00	6.30	78.20	4,357.56	51.70	219.64	189.69	0.80	-0.64	4.26
4,463.00	5.80	80.00	4,451.03	53.58	229.36	197.80	0.57	-0.53	1.91
4,556.00	5.10	80.30	4,543.61	55.09	238.06	204.93	0.75	-0.75	0.32
4,651.00	4.50	81.90	4,638.28	56.33	245.92	211.27	0.65	-0.63	1.68
4,744.00	3.80	83.70	4,731.04	57.18	252.59	216.52	0.77	-0.75	1.94
4,839.00	3.40	86.30	4,825.85	57.71	258.53	221.02	0.45	-0.42	2.74
4,932.00	2.60	89.50	4,918.72	57.90	263.39	224.54	0.88	-0.86	3.44
5,026.00	1.80	96.20	5,012.65	57.76	266.99	226.94	0.89	-0.85	7.13
5,113.40	1.13	125.26	5,100.02	57.12	269.06	227.91	1.12	-0.76	33.25
TARGET 1- SKELLY UNIT # 661									
5,120.00	1.10	128.70	5,106.62	57.04	269.16	227.92	1.12	-0.48	52.13
5,214.00	0.40	148.40	5,200.61	56.20	270.04	227.92	0.78	-0.74	20.96
5,308.00	0.50	149.90	5,294.61	55.56	270.42	227.73	0.11	0.11	1.60
5,401.00	0.40	163.00	5,387.61	54.90	270.72	227.46	0.15	-0.11	14.09
5,495.00	0.40	168.90	5,481.60	54.26	270.88	227.11	0.04	0.00	6.28
SURVEY 5495' MD 0.40° INC 168.90° AZM									
5,590.00	0.50	171.90	5,576.60	53.53	271.00	226.67	0.11	0.11	3.16
SURVEY 5590' MD 0.50° INC 171.90° AZM									
5,684.00	0.20	243.10	5,670.60	53.05	270.91	226.26	0.51	-0.32	75.74
SURVEY 5684' MD 0.20° INC 243.10° AZM									
5,716.00	0.20	209.70	5,702.60	52.97	270.83	226.15	0.36	0.00	-104.38
SURVEY 5716' MD 0.20° INC 209.70° AZM - PBHL- SKELLY UNIT #661									



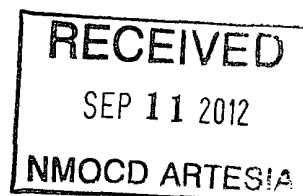
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Project:	EDDY COUNTY, NEW MEXICO	TVD Reference:	RKB @ 3903 00usft (Original Well Elev)
Site:	SKELLY UNIT	MD Reference:	RKB @ 3903 00usft (Original Well Elev)
Well:	SKELLY UNIT # 661	North Reference:	Grid
Wellbore:	ORIGINAL HOLE	Survey Calculation Method:	Minimum Curvature
Design:	ORIGINAL HOLE	Database:	EDM 5000 1 Single User Db

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N-S (usft)	+E-W (usft)	
5,495.00	5,481.60	54.26	270.88	SURVEY 5495' MD 0 40° INC 168 90° AZM
5,590.00	5,576.60	53.53	271.00	SURVEY 5590' MD 0 50° INC 171.90° AZM
5,684.00	5,670.60	53.05	270.91	SURVEY 5684' MD 0.20° INC 243 10° AZM
5,716.00	5,702.60	52.97	270.83	SURVEY 5716' MD 0 20° INC 209 70° AZM



PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288



May 11, 2012

COG, LLC
Fasken Center, Tower II
550 West Texas Ave, Suite 1300
Midland, TX 79701

RE: Skelly Unit #661
932' FSL & 709' FWL
Sec. 14, T17S, R31E
Eddy County, New Mexico

Dear Sir,

The attached is the Deviation Survey for the above captioned well.

Very truly yours,

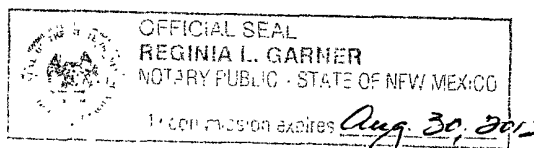
A handwritten signature in cursive script, appearing to read "Eddie C. LaRue".

Eddie C. LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 11th day of May, 2012.

A handwritten signature in cursive script, appearing to read "Regina L. Garner".

Notary Public

Pason DataHub Deviation Survey
 # Well Dossier 1335710827 - Skelly Unit 661
 #

# Date	Depth	Deviation	Direction
4/30/2012	173	0.8	0
5/1/2012	260	0.4	0
5/1/2012	376	0.9	0
5/1/2012	464	0.7	0
5/1/2012	518	0.7	0
5/2/2012	751	0.7	0
5/2/2012	1190	0.6	0
5/3/2012	1630	0.8	0
5/3/2012	1930	0.3	0
5/4/2012	2013	0.6	38.70
5/4/2012	2106	1.1	83.90
5/4/2012	2201	1.6	84.40
5/4/2012	2295	2.6	95.30
5/4/2012	2389	2.9	83.90
5/5/2012	2484	19.8	73.30
5/5/2012	2577	3.8	74.40
5/5/2012	2671	4.3	80.50
5/5/2012	2765	5.1	78.60
5/5/2012	2859	6.2	76.80
5/5/2012	2953	5.4	76.30
5/5/2012	3047	5.5	77.00
5/5/2012	3141	4.9	76.50
5/5/2012	3235	5.6	78.60
5/5/2012	3329	6.2	81.60
5/5/2012	3423	6.9	8.03
5/5/2012	3524	7.4	80.20
5/6/2012	3618	7.2	78.20
5/6/2012	3712	6.8	78.10
5/6/2012	3806	7.0	79.10
5/6/2012	3900	7.0	78.80
5/6/2012	3993	7.0	78.10
5/6/2012	4088	6.9	75.90
5/6/2012	4181	7.0	74.40
5/6/2012	4275	6.9	74.20
5/6/2012	4369	6.3	78.20
5/6/2012	4463	5.8	80.00
5/6/2012	4556	5.1	80.30
5/6/2012	4651	4.5	81.90
5/6/2012	4744	3.8	83.70
5/7/2012	4779	3.4	86.30
5/7/2012	4932	2.6	89.50

#	Date	Depth	Deviation	Direction
	5/7/2012	5026	1.8	96.20
	5/7/2012	5120	1.1	128.70
	5/7/2012	5214	0.4	148.40
	5/7/2012	5308	0.5	149.90
	5/7/2012	5401	0.4	163.00
	5/7/2012	5531	0.4	168.90
	5/7/2012	5590	0.5	171.90
	5/7/2012	5684	0.2	243.10
	5/7/2012	5711	0.2	209.70
	5/8/2012	5940	0.8	0
	5/8/2012	6190	0.6	0
	5/8/2012	6627	0.6	0
	5/9/2012	6777	0.9	0

EOF



Company: COG Operating LLC (Concho)

Lease/Well: Skelly Unit/661

Location: S14 T17s R31e

Rig Name: Silver Oak 1

State/County: New Mexico/Eddy

Latitude: 32.83

GRID North is 0.26 Degrees East of True North

VS-Azi: 0.00 Degrees



Elevation : RKB=12'

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: skelly unit #661_gyro_survey.ut

Minimum Curvature Method

Report Date/Time: 5/10/2012 / 11:48

Vaughn Energy Services

Gardendale, Texas

432-563-5444

Surveyor: Dustin Wedel

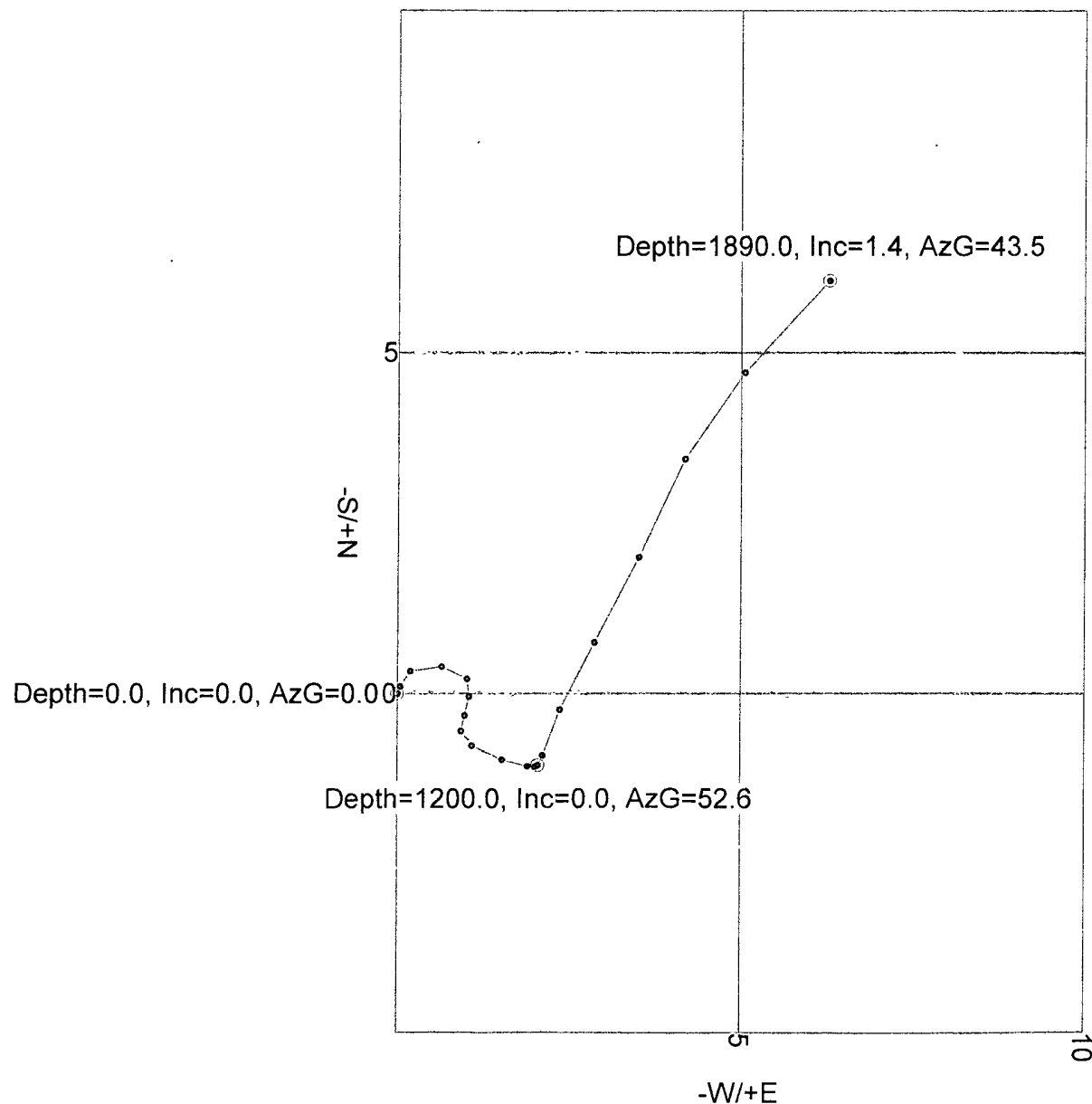
Skelly Unit 661 / API# 30-015-40092

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.13	21.65	100.00	0.11	0.04	0.11	21.65	0.13
200.00	0.19	43.73	200.00	0.33	0.20	0.39	30.93	0.08
300.00	0.39	98.47	300.00	0.40	0.65	0.76	58.45	0.32
400.00	0.16	164.85	400.00	0.22	1.03	1.05	78.02	0.36
500.00	0.15	183.35	500.00	-0.04	1.05	1.06	92.32	0.05
600.00	0.18	201.43	600.00	-0.32	0.99	1.04	107.81	0.06
700.00	0.10	174.53	700.00	-0.55	0.94	1.09	120.23	0.10
800.00	0.23	130.16	800.00	-0.76	1.10	1.33	124.61	0.17
900.00	0.34	105.74	899.99	-0.97	1.54	1.82	122.14	0.17
1000.00	0.09	99.71	999.99	-1.06	1.91	2.18	119.11	0.25
1100.00	0.04	71.80	1099.99	-1.07	2.02	2.28	117.85	0.06
1200.00	0.01	52.59	1199.99	-1.05	2.06	2.31	116.99	0.02
1300.00	0.17	22.51	1299.99	-0.90	2.12	2.31	113.04	0.16
1400.00	0.65	19.55	1399.99	-0.23	2.37	2.38	95.59	0.48
1500.00	0.63	34.43	1499.98	0.76	2.87	2.97	75.25	0.17
1600.00	0.99	22.86	1599.97	2.00	3.52	4.05	60.34	0.39
1700.00	0.83	26.93	1699.96	3.44	4.18	5.41	50.53	0.17
1800.00	0.95	41.29	1799.95	4.71	5.05	6.91	47.02	0.25

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1890.00	1.37	43.48	1889.93	6.05	6.28	8.72	46.09	0.46



Vaughn Energy Services
Gardendale, Texas
432-563-5444
Surveyor: Dustin Wedel
Skelly Unit 661 / API# 30-015-40092



VES Survey Date: 05/03/2012